



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,733	03/30/2001	Andrew J. Thurston	M-8341 US	7241

33031 7590 09/29/2004

CAMPBELL STEPHENSON ASCOLESE, LLP
4807 SPICEWOOD SPRINGS RD.
BLDG. 4, SUITE 201
AUSTIN, TX 78759

EXAMINER

TON, DAVID

ART UNIT	PAPER NUMBER
----------	--------------

2133

DATE MAILED: 09/29/2004

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Sk

Office Action Summary

Application No.

09/822,733

Applicant(s)

THURSTON, ANDREW J.

Examiner

David Ton

Art Unit

2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09/01/04 (IDS).
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28-35 is/are allowed.
- 6) ☒ Claim(s) 1, 5-8, 10, 12, 14, 15, 20, 36, 38, 40-42, 46-48, 50, 51 and 53 is/are rejected.
- 7) ☒ Claim(s) 2-4, 9, 11, 13, 16-19, 21-27, 37, 39, 43-45, 49, 52 and 54 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5&6.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

1. The abstract is objected because it is over 150 words. A new abstract is required. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. Correction is required. See MPEP § 608.01(b).
2. Claims 1-54 are presented for examination.

Claim Rejections - 35 USC ' 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1, 6, 12, 36, and 40 are rejected under 35 U.S.C. § 102(e) as being anticipated by **Chen** patent no. **6,571,368**.

Art Unit: 2133

5. As to claim 1, Chen teaches the invention as claimed, including a method of decoding an error correction code in a data signal [see claim 17], comprising the steps of:

Receiving the data signal [signal r_j of Fig. 5] at a decoding unit;
Computing a plurality of syndromes [by syndrome computation 511 of Fig. 5&8] associated with the data signal using the decoding unit;
Generating an error polynomial [see "error location polynomial" of claim 17] from the data signal using one or more Galois field multiply accumulators each of which contains a Galois field multiplier feeding a Galois field adder [see Fig. 24 and col. 17 lines 36-46]; and
Locating errors within the data signal using the error polynomial [see "error evaluation means" of claim 17].

6. As to claim 6, Chen teaches computes $2t$ syndromes [see claim 1].

7. As to claim 12, Chen teaches locating the error by determining root of the error polynomial [see claim 17].

8. As to claim 36, Chen teaches a decoder circuit comprising: a plurality of syndrome input [$S(x)$ of Fig. 6], a plurality of Galois field accumulators [element 2041 of Fig. 24] and means for using said Galois field multiply accumulators to generate an error polynomial based on values provided at said syndrome inputs [col. 9 lines 32-43].

9. As to claim 40, Chen teaches generating step performed in a single clock cycle [see "one clock period " of Fig. 8].

Claim Rejections - 35 USC ' 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the

Art Unit: 2133

subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 5, 7-8 and 10 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Chen** patent no. **6,571,368**, in view of **Cameron** patent no. **6,684,364**.

12. As to claims 5 and 14, Chen teaches the method substantially as shown in claim 1 above for Reed-Solomon (RS) code. However, Chen does not explicitly teach the decoder for BCH code.

However, Cameron discloses that RS is a subset of BCH code [col. 1 lines 45-55].

It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to enhance the teachings of Chen to apply for a BCH code. This modification would have been obvious and a person having ordinary skill in the art would have been motivated to do so because it would enhance the application of Chen for a BCH code.

Art Unit: 2133

13. As to claim 7, Cameron teaches using linear feedback register to compute the syndromes [col. 7 lines 4-21].

14. As to claim 8, Chen teaches computing includes dividing by a Galois polynomial and evaluating a remainder [see claim 3].

15. As to claim 10, Chen teaches generating step performed in a single clock cycle [see "one clock period " of Fig. 8].

16. As to claims 15, and 41-42, Chen teaches calculating a plurality of coefficients of at least one of the minimum degree polynomial [col. 18 lines 37-60, Fig. 28].

17. Claims 20 and 38 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Chen** patent no. **6,571,368**, in view of **Cameron** patent no. **6,684,364** and further in view of **Weng** patent no. **5,710,782**.

18. As to claims 20 and 38, Chen teaches calculate at least three minimum degree polynomial [see Fig. 28]. However, Chen and Cameron do not teach the decoder for triple error correcting code.

Weng teaches a system for three and four errors of a RS or BCH code [see claim 1].

It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the teachings of Chen and Cameron to apply for triple error correcting code as taught by Weng. This modification would have been obvious and a person having ordinary skill in the art would have been motivated to do so because it would enhance the application of Chen and Cameron.

Art Unit: 2133

19. Claims 46-47, 50-51, and 53 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Theodoras, II et al.** (Theodoras) patent no. **6,751,743**, in view of **Chen** patent no. **6,571,368**.

20. As to claim 46, Theodoras teaches the invention as claimed, including an OC-192 input/output card [see Fig.6] comprising:

Four OC-48 processors [col. 8 lines 50-65]; and an OC-192 front-end [Framer 600 of Fig. 6] connected to said four OC-48 processors, said OC-192 front-end having means for de-interleaving and OC-192 signal to create four OC-48 signals, and means for decoding error-correction codes embedded in each of the four OC-48 signal [see col. 8 lines 50-65].

Theodoras does not teach the Framer 600 in an ASIC and including a plurality of Galois field multiply accumulators.

Chen teaches a decoder including a plurality of Galois field multiply accumulators [see Fig. 24].

It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the Framer taught by Theodoras to include a decoder having a plurality of Galois field multiply accumulators as taught by Chen. This modification would have been obvious and a person having ordinary skill in the art would have been motivated to do so because it would improve the error correcting capability of the Framer. Theodoras and Chen do not teach to build the Framer in an ASIC. However, it would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to build the Framer in an ASIC as a matter of design choice. This modification would have been obvious and a person having ordinary skill in the art would have been motivated to do so because it would save space for the circuit card.

21. As to claim 47, Chen teaches the operation is performed in a single clock cycle [see "one clock period " of Fig. 8].

22. As to claim 50, Chen teaches computing includes dividing by a Galois polynomial and evaluating a remainder [see claim 3].

23. As to claim 51, Chen teaches locating the error by determining root of the error polynomial [see claim 17].

Art Unit: 2133

24. As to claim 53, Chen teaches calculating a plurality of coefficients of at least one of the minimum degree polynomial [col. 18 lines 37-60, Fig. 28].

25. Claim 48 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Theodoras, II et al.** (Theodoras) patent no. **6,751,743**, in view of **Chen** patent no. **6,571,368** and further in view of **Weng** patent no. **5,710,782**.

26. As to claim 48, Theodoras and Chen do not teach the decoder for triple error correcting code.

Weng teaches a system for three and four errors of a RS or BCH code [see claim 1].

It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the teachings of Theodoras and Chen to apply for triple error correcting code as taught by Weng. This modification would have been obvious and a person having ordinary skill in the art would have been motivated to do so because it would enhance the application of Theodoras and Chen.

27. Claims 2-4, 9, 11, 13, 16-19, 21-27, 37, 39, 43, 44-45, 49, 52 and 54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

28. Claims 28-35 are allowed.

Conclusion

Art Unit: 2133

29. The prior art of record and not relied upon is considered pertinent to applicant's disclosure.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Ton, whose telephone number is (703) 306-3043. The examiner can normally be reached on Monday through Thursday from 6:30 AM to 4:00 PM and alternate Friday from 6:30 AM to 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady, can be reached at (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



DT

September 27, 2004

**DAVIDTON
PRIMARY EXAMINER**